

IN THE CLAIMS:

1. (Previously Presented) A method for fabricating a silicide for a semiconductor device, said method comprising:

depositing a metal containing silicon on a silicon substrate;

reacting said metal containing silicon to form a first silicide phase;

etching any unreacted metal containing silicon;

depositing a silicon cap layer over said first silicide phase;

reacting the silicon cap layer to form a second silicide phase, for said semiconductor device; and

etching any unreacted silicon from said silicon cap layer.

2. (Original) The method of claim 1, wherein said substrate comprises a bulk silicon substrate.

3. (Original) The method of claim 1, wherein said substrate comprises a silicon-on-insulator (SOI) substrate.

4. (Previously Presented) A method for fabricating a silicide for a silicon region, said method comprising:

depositing a metal containing silicon on a bulk silicon substrate;

reacting said metal containing silicon to form a first silicide phase;

etching any unreacted metal containing silicon;

depositing a silicon cap layer over said first silicide phase;
reacting the silicon cap layer to form a second silicide phase; and
etching any unreacted silicon from said silicon cap layer.

5. (Previously Presented) The method of claim 4, wherein said depositing of said metal containing silicon comprises performing a blanket deposition, wherein said metal comprises one of Co and Ti.
6. (Original) The method of claim 5, wherein said blanket deposition includes cobalt having a film thickness in a range of approximately 7 nm to approximately 8 nm.
7. (Previously Presented) The method of claim 6, wherein said blanket deposition is followed by a TiN cap deposition for preventing oxidation during a subsequent anneal processing.
8. (Previously Presented) The method of claim 4, wherein said reacting of said metal containing silicon comprises performing a first rapid thermal anneal (RTA) to form a metal-silicon phase, such that the deposited metal containing silicon with the underlying bulk silicon substrate, converts some of the Si into metal-Si,
wherein said etching comprises selectively etching any unreacted metal, thereby leaving the metal-silicon regions intact,

wherein said depositing of said silicon cap comprises performing a blanket deposition of a silicon film, and

wherein said reacting of said silicon cap comprises performing a second RTA to form a metal di-silicide.

9. (Canceled)

10. (Previously Presented) A method for fabricating a silicide for a silicon region, said method comprising:

depositing a metal on a bulk silicon substrate;
reacting said metal to form a first silicide phase;
etching any unreacted metal;
depositing a silicon cap layer over said first silicide phase;
reacting the silicon cap layer to form a second silicide phase; and
etching any unreacted silicon from said silicon cap layer,

wherein said metal is co-deposited with silicon.

11. (Previously Presented) The method of claim 10, wherein said metal is cobalt, and said metal co-deposited with silicon is $Co_{1-x}Si_x$, with $x < 0.3$.

12. (Original) The method of claim 4, wherein said method forms a raised source-drain structure by a blanket deposition which uses processing other than epitaxial processing.

13. (Previously Presented) A method for fabricating a silicide, said method comprising:
providing a substrate having a silicon layer;
depositing a metal containing silicon over said silicon layer;
reacting said metal containing silicon to form a first silicide phase;
etching any unreacted metal containing silicon; and
depositing a silicon cap layer over said metal containing silicon;
reacting the silicon cap layer, to form a second silicide phase; and
etching any unreacted silicon from said silicon cap layer.

14. (Canceled)

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Canceled)

20. (Canceled)

21. (Canceled)

22. (Canceled)

23. (Previously Presented) The method of claim 1, wherein said first silicide phase comprises the first forming silicide phase.

24. (Previously Presented) The method of claim 4, wherein said first silicide phase comprises the first forming silicide phase.

25. (Previously Presented) A method for fabricating a silicide for a semiconductor device, said method comprising:

depositing a metal containing silicon on a silicon substrate;
reacting said metal containing silicon to form a first forming silicide phase;
etching any unreacted metal containing silicon;
depositing a silicon cap layer over said first forming silicide phase;
reacting the silicon cap layer to form a second silicide phase, for said semiconductor device; and
etching any unreacted silicon from said silicon cap layer.

26. (Previously Presented) A method for fabricating a silicide for a silicon region, said method comprising:

depositing a metal containing silicon on a bulk silicon substrate;
reacting said metal containing silicon to form a first silicide phase;

etching any unreacted metal containing silicon;
depositing a silicon cap layer over said first silicide phase;
reacting the silicon cap layer to form a second silicide phase; and
etching any unreacted silicon from said silicon cap layer,
wherein said metal is nickel.

27. (Previously Presented) The method of claim 1, wherein said first silicide phase comprises a metal-rich phase.

28. (Previously Presented) The method of claim 1, wherein said depositing said metal containing silicon is for extending a temperature window in which a silicide metal-rich phase exists.

29. (Previously Presented) The method of claim 4, wherein said first silicide phase comprises a metal-rich phase.

30. (Previously Presented) The method of claim 4, wherein said depositing said metal containing silicon is for extending a temperature window in which a silicide metal-rich phase exists.

31. (Previously Presented) The method of claim 10, wherein said first silicide phase comprises a metal-rich phase.

32. (Previously Presented) The method of claim 10, wherein said depositing said metal containing silicon is for extending a temperature window in which a silicide metal-rich phase exists.

33. (Previously Presented) The method of claim 13, wherein said first silicide phase comprises a metal-rich phase.

34. (Previously Presented) The method of claim 13, wherein said depositing said metal containing silicon is for extending a temperature window in which a silicide metal-rich phase exists.

35. (Previously Presented) The method of claim 25, wherein said first forming silicide phase comprises a metal-rich phase.

36. (Previously Presented) The method of claim 25, wherein said depositing said metal containing silicon is for extending a temperature window in which a silicide metal-rich phase exists.

37. (Previously Presented) The method of claim 26, wherein said first silicide phase comprises a silicon-rich phase.

38. (Previously Presented) The method of claim 26, wherein said depositing said metal containing silicon is for extending a temperature window in which a silicide metal-rich phase exists.